Annals of Clinical and Analytical Medicine
Case Report

The use of double antibiotic paste for the management of huge periradicular lesion and external root resorption: A case report with 22 months follow-up

Management of huge apical lesion and external root resorption

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Abstract
Large lesions may result in root resorption and tooth loss if not treated effectively. A 41-year-old male patient presented with pain in the left mandibular molar region. On clinical examination, there was no swelling, fistula, or sensitivity to percussion, but restoration was in the mandibular left second molar tooth. Radiographic examination revealed a large periapical lesion and external root resorption around the apices of the mandibular left second molar tooth. During treatment, NaOCl was preferred as an irrigation solution, Endoactivator was preferred for irrigation activation, and DAP was preferred as a medicament. Periapical healing was observed three and six months after the first appointment. Complete recovery of the periapical tissues was seen at 22 months of follow-up. The successful outcome seen in this case shows that even teeth with large periapical lesion and external root resorption can be managed conservatively with non-surgical endodontic treatment when effective disinfection is achieved.

Keywords
Antibiotics, Endoactivator, Endodontic Lesion, External resorption, Long-Term Follow-Up

DOI: 10.4328/ACAM.21651 Received: 2023-02-12 Accepted: 2023-03-20 Published Online: 2023-03-22 Printed: 2023-03-25 Ann Clin Anal Med 2023;14(Suppl 1):S122-124
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Introduction

Apical periodontitis is an inflammatory lesion in the periodontal tissues that is caused usually by bacterial elements derived from the infected root canal system of teeth. Apical periodontitis may be viewed as a dynamic battle between invading microbes and host cells and tissues. Etiological factors that cannot be eliminated from the root canal space by the host response may initiate a chronic inflammatory process. This results in the resorption of hard tissues, local inflammation, and destruction of periapical tissues [1].

Apical inflammatory root resorption may occur as a result of periradicular inflammation. Teeth diagnosed with apical periodontitis have degrees of root resorption that may or may not be observed on radiography [2]. Since inflammatory root resorption is usually caused by bacterial infection of the root canal system, the ideal treatment prognosis can be achieved using antimicrobial procedures [3, 4].

CH is an effective material used as an intracanal medicament and is highly preferred. However, it is not always effective in battling bacteria in root canals, and its ability to penetrate directly into the dentinal tubules is insufficient. In addition, its effect on bacterial biofilm is lower than double antibiotic paste (DAB) and triple antibiotic paste (TAP). The mixture of ciprofloxacin, metronidazole, and minocycline, known as a TAP, is the most popular medicament in endodontics. But its disadvantage is coronal discoloration. Minocycline was removed from the DAP (ciprofloxacin, metronidazole) to prevent color changes [3].

This case report describes the successful management of huge lesion and external root resorption using DAP as intracanal medicament.

Case Report

A 41-year-old male patient without any systemic disease was admitted to our clinic with a complaint of pain in the left mandibular molar region. On clinical examination, there was no swelling, fistula, or sensitivity to percussion, but restoration was in the mandibular left second molar tooth. As a result of radiographic examination, external root resorption, and periapical lesion were observed in the mesial and distal root of the tooth (Figure 1).

At the first appointment of the treatment, the access cavity was accomplished using a diamond bur under rubber dam isolation. Working length was determined using periapical radiography and with the help of the apex locator using a #50 H-file in the distal canal and a #20 H-file and K-file in the mesial canals. Root canals were shaped by circumferential preparation techniques with hand instruments. Irrigation was performed with 5 mL of 5.25% sodium hypochlorite using a side-perforated needle syringe between each file and activated with Endoactivator (Dentsply, Tulsa Dental, Tulsa, OK, USA), and 5 mL of 17% EDTA was used for final irrigation. Root canals were dried with sterile paper points. Ciprofloxacin and metronidazole were ground into a powder and mixed with distilled water to a creamy consistency. This antibiotic mixture was applied to the canal using a Lentulo spiral. The access cavity was temporarily restored with glass ionomer (Kavitan Plus, Spofa Dental, Jicin, Czech).

The next appointment was made four weeks later, but he

Figure 1. Preoperative radiograph showing a large periapical lesion and external root resorption at the apical of the mandibular left second molar.

Figure 2. Follow-up 6 months after the first appointment. The periapical radiograph shows the healing of the periapical lesion.

Figure 3. The radiographic image of the healing of the periapical tissue at the end of 22 months follow-up.

returned three months after the first visit. The tooth was asymptomatic to percussion and palpation. In addition, radiological examination revealed that the lesion was healing. After removing the antibiotic mixture from the root, the root canals were re-instrumented and irrigated again with the Endoactivator. The root canal was dried with sterile paper cones. The root canals were obturated with gutta-percha and AH-Plus (Dentsply Sirona, York, PA, USA) sealer using the lateral condensation technique. The permanent restoration of the tooth was made with composite.

At the follow-up appointment six months later, the patient did not have any symptoms and the periapical lesion continued to heal (Figure 2). The patient was recalled for up to 22 months. It was observed that the tooth was functional and clinically asymptomatic and there was no further progress in external root resorption. In addition, there was no visible discoloration of the tooth. Radiographically, it was observed that the periradicular lesion was completely healed and the lamina dura occurred (Figure 3).

Discussion

There are many disadvantages of the surgical option in cystic lesions. These are the reduction of bone support, damage to anatomical structures such as the mental foramen and lower alveolar nerve, and destruction of blood vessels and nerves feeding the teeth adjacent to the surgical area. However, it has been reported that apical lesions up to 20 mm can be healed with root canal treatment [1]. In addition, the cement layer may be eroded due to surface root resorption caused by apical periodontitis. Thus, bacterial mediators can cross the dentinal tubules, stimulating inflammation in the periodontal ligament and causing root resorption [2].

Adequate biomechanical cleaning of the root canal system is a key factor for healing periradicular lesions. However, due to the complex structure of the root canal anatomy, only biomechanical preparation is not sufficient for the elimination of bacteria in the root canals. In addition to chemomechanical preparation, various irrigation activation techniques and medicaments have been suggested for more effective disinfection of root canals [3].

CH is one of the most preferred intracanal medicaments in root canal treatment. However, it is not successful enough in eliminating bacteria due to its limited penetration into the dentinal tubules [3]. In the case report of Taneja and Kumari [5], describing the non-surgical endodontic treatment of teeth with large periradicular lesions, CH was used in the first stage and no healing was obtained. Then the treatment protocol was changed and triple antibiotic paste (TAP) was used instead of CH. As a result, it was reported that the symptoms disappeared and the periradicular lesion healed. Despite the many advantages of triple antibiotic paste, discoloration was reported [6]. In this context, DAP containing metronidazole and ciprofloxacin was developed by removing minocycline from the TAP to prevent coloration. Moreover, DAP and TAP are comparable in their antibacterial activities against Enterococcus faecalis and porphyromonas gingivalis. DAP is the preferred intracanal antibiotic mixture due to its beneficial effects [3].

In the presented case, the cessation of external root resorption, the onset of healing of the lesion, and in clinical examination and healthy appearance of soft tissues were observed at 6 months. However, the complete reconstruction of the trabecular structure, formation of the lamina dura, and the restoration of the periodontal state occurred within 22 months. These indicators indicate that the treatment has been successful. An effective antimicrobial endodontic treatment by applying DAP, including disinfection of dentinal tubules, can stop the inflammatory resorptive formation and provide periradicular healing. This is also supported by the clinical results of our case.

Conclusion

From the presented case it can be concluded that DAP has the potential to be used in teeth has a huge lesion and external root resorption. In addition, it has been seen that teeth with large lesions and external resorption can be treated without the need for surgery by using adequate irrigation activation and medicaments.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

Conflict of interest

None of the authors received any type of financial support that could be considered potential conflict of interest regarding the manuscript or its submission.

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How to cite this article:

Muhammed Ayhan, Tuğçenur Yıldız, Ömer Bilgin. *The use of double antibiotic paste for the management of huge periradicular lesion and external root resorption: A case report with 22 months follow-up. Ann Clin Anal Med 2023;14(Suppl 1):S122-124*